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**(54) Title:** UPGRADING TITANIFEROUS MATERIALS**(57) Abstract**

The application discloses a process for upgrading a titaniferous material by removal of impurities contained in the material especially radionuclides. The process involves heating the titaniferous material to a temperature of less than 1300 °C to form a solid titaniferous phase and a liquid oxide or glassy phase in the presence of a material that promotes the formations of such phases, cooling the product at a rate that maintains the glassy phase in an amorphous state and leaching the solidified material with an acid or an alkali to remove the impurities. Materials that promote the formation of the desired phases include compounds of alkali metals and boron. Examples include borax, caustic soda, soda ash and silica.